REMARKS/ARGUMENTS

Applicants have carefully reviewed the final Office Action dated October 19, 2006 and Advisory Action dated January 4, 2007. Reconsideration of the Examiner's rejection of the claims is respectfully requested. A total of 24 claims remain in the case. These are claims 1 through 24. Independent claim 1 has been amended to include further patentable distinctions over the cited art. Dependent claims 2-24 have been amended to recite a non-ionic styrenic resin composition now recited in amended claim 1.

The Invention

The invention, as now claimed, pertains to a non-ionic styrenic resin composition that consists of a non-ionic rubber modified styrene maleic anhydride (SMA) copolymer and polybutene, and optionally, other additives; articles made from the composition; and methods for preparing this composition.

The main components of this non-ionic styrenic resin composition do not contain any anionic functional groups, and therefore, the styrenic resin composition can be considered as being non-ionic. Claim 1 has been amended to include this feature. It is to be particularly understood that the anhydride component of the rubber modified styrene maleic anhydride (SMA) copolymer does not include any anionic functional groups.

In the Advisory Action dated January 4, 2007, the Examiner suggests that the "recitation of 'non-ionic' in the claims does not appear to have support in the Specification, as originally filed." While the Examiner's suggestion may have merit, "[t]he fundamental inquiry is whether the material added by amendment was inherently contained in the original

application." *Litton Sys., Inc. v. Whirlpool Corp.*, 728 F.2d 1423, 1438 (Fed.Cir. 1984). An "applicant must show that its original application supports the amended matter." *Shering Corp. v. Amgen Inc.*, 222 F.3d 1347, 1352 (Fed.Cir. 2000).

Given its ordinary meaning, the term "ionic" refers to a compound that "contains cations and anions in fixed whole-number ratios, as described by the chemical formula." *Chemistry - The Molecular Science, Second Edition*, page 64, Olmsted & Williams, Wm. C. Brown Publishers, Dubuque, Iowa, 1997. The prefix "non" means not having or a lack of. *Illustrated Oxford Dictionary*, page 555, Oxford University Press, Inc., New York, NY, 1998. Therefore "non-ionic" means not having cations and anions.

The claims, as amended refer to a non-ionic styrenic resin composition that includes a non-ionic rubber modified styrene maleic anhydride copolymer, which is prepared by reacting styrene monomers, maleic anhydride, and rubber in a suitable reactor under free radical conditions and adding the polybutene to the reactive mixture (page 11, lines 18-22 of the Specification).

The rubber can be ethylene-propylene copolymers, ethylene propylene copolymers in which other polyunsaturated monomers have been copolymerized, polybutadiene, butadiene, styrene-butadiene rubber, butadiene-acrylonitrile rubber, polychloroprene, acrylate rubber, chlorinated polyethylene rubber, polyisoprene and/or cyclo-olefin rubbers (page 12 line 28 to page 13, line 3 of the Specification).

A consistent theme with the materials, styrene, maleic anhydride, polybutene and rubber, is that the molecular formulas for each do not include cations and anions. Thus, the description "non-ionic" to describe the styrenic resin composition and rubber modified styrene maleic anhydride copolymer is inherently contained in the original

Specification as filed, therefore, the descriptive term "non-ionic" in the claims is supported in the Specification.

An important feature of the invention as recited in claims 6, 7, 18, 19, 20, 21, and 22, is that the polybutene is added to the components forming a rubber modified SMA copolymer during the polymerization process in a reactor vessel and not simply blended together with the other components of the styrenic resin composition in a melting process.

The addition of the polybutene to the components for forming the rubber modified SMA, especially during the polymerization process, enhances the properties of the rubber component in that it is believed by the inventors that the polybutene gravitates toward and surrounds the rubber component and not the SMA component (Page 9, lines 24-32 to page 10, lines 1-9 of the specification).

Claim Rejection under 35 U.S.C. 103(a)

Claims 1-24 are again rejected under 35 U.S.C. 103(a) as being unpatentable over Kim (US 6,930,150) taken with Wang et al (US 5,852,124). The Examiner repeats the previous reasons for this rejection in that Kim teaches the modification of polyolefin resins with a styrene-maleic acid copolymer that may itself be modified. The Examiner brings Applicants' attention to column 5(lines 15-36), which teaches the inclusion of polybutene, which at column 6 (lines 58-60) may be added to other polymers including at column 8(lines 31-60) styrene-maleic anhydride polymers, which may be functionalized.

The Examiner continues by stating that the Wang et al. reference shows the rubber modified styrene-maleic anhydride as recited and claimed in the subject patent application for modification of other thermoplastic resins as an impact

modifier. The Examiner directs Applicants' attention to column 2(lines 23 et seq.), column 3 (lines 9-33) and column 8 (lines 40-65) for the use with other polymers, and states that the polymers listed therein contain many that are disclosed by Kim at column 9(lines 50 et seq.). As such, the use thereof in the polybutene composition would have been an obvious modification to an artisan at the time the invention was made.

Kim (US 6,930,150) discloses a method for making polymer blend compositions which involves combining at least one component A incorporating at least 5% by weight of anionic functional groups in its structure, at least one Component B free of such functional groups, and at least one Component C which is a metal cation. By Kim's definition appearing in column 1, lines 27-39, which states that: "Typically, polymer blends are prepared by taking the base polymers in their finished form and mixing them using variety of known dry blending or melt mixing techniques. Alternatively, the polymer composition can be melt-mixed using calendaring mills, or any type of internal mixer, such as an extruder or Banbury mixer."

As disclosed in column 4, lines 60-67 to column 5, lines 1-5, Kim is addressed to a method of making a polymer blend composition by 1) first blending together at least one component A that is a monomer, oligomer, prepolymer, or polymer having at least 5% by weight of anionic functional groups selected from the group consisting of sulfonic acid, phosphoric acid, and carboxylic acid, at least one component B that is an oligomer, prepolymer or polymer having less by weight of anionic functional groups than the weight percentage of anionic functional groups of component A, and at least one component C that is a metal cation, to form a first composition, and 2) melt processing the first composition to produce a reaction product of the anionic functional groups of

component A and component C to form the polymer blend composition.

As disclosed in column 6, lines 41-43, this melt processing of components A, B, and C is done in situ to form a polymer blend composition incorporating a pseudo-crosslinked polymer network. Kim teaches and the examples illustrate forming the polymer blend composition through a combination of dry blending and melt mixing steps using twin extrusion devices.

While Kim may disclose the inclusion of polybutene in component A, that component in total must have at least 5% anionic group. Applicants draw the Examiner's attention to column 5, lines 15-35 wherein this teaching includes the inclusion of polybutene in component A; however, it does not teach the inclusion of polybutene by itself. There is no teaching in this reference that adding polybutene affects the finished product. Even though styrene maleic anhydride copolymers without anionic groups can be component B, and polybutene can be included in component A, Kim still teaches that there has to be another component in A that is anionic. The claimed invention teaches two main components that do not contain any anionic functional groups, resulting in a non-ionic styrenic resin composition.

The invention relates to a non-styrenic resin composition, and methods for preparing this non-ionic styrenic resin composition. The non-styrenic resin composition contains two main components, i.e., 1) a non-ionic rubber modified styrene maleic anhydride copolymer, which, in turn, contains three components which are rubber, styrene, and maleic anhydride (has no anionic functional groups), and 2) polybutene, none of which contain any anionic functional groups. Claim 1, as now amended, recites that the non-styrenic resin composition consists of a non-ionic rubber

modified styrene maleic anhydride copolymer and polybutene. Claim 1, as amended also recites other components that may optionally be included in the non-styrenic resin composition of the invention. Support for this new recitation appears on pages 14 and 15 of the specification.

The methods for preparing this styrenic resin composition involves adding polybutene to the other three components forming the rubber modified styrene maleic anhydride copolymer, i.e., styrene monomer, maleic anhydride and rubber, in a polymerization reactor vessel as claimed in product claim 6 and method claims 19 and 20, or adding the polybutene to the partially polymerized syrup containing the styrene monomer, maleic anhydride and rubber after the syrup exits the polymerization reactor vessel and before it enters a devolatilizer as claimed in product claim 7 and method claims 21, 23, and 24.

The non-ionic styrenic resin composition and the methods for preparing this resin composition of the claimed invention are totally different from the teachings of the Kim reference.

First, Kim refers to polymer blends, which as explained herein above, involve blending components A, B, and C through a combination of dry blending and melt mixing via extrusion techniques. In the claimed invention, polybutene is added to the components either before or after reaction in a polymerization reactor vessel and/or shortly before or after the devolatilization process which follows the polymerization process. Second, this reference teaches polymer blends containing components A, B, and C wherein either component A or B contains at least 5% and as high as 50% by weight anionic functional groups and the other component of these two components as containing less than 5% and preferably are free of anionic functional groups. In the invention, none of the components of the styrenic resin composition contain any

anionic functional groups. As now claimed in amended claim 1, the rubber modified styrene maleic anhydride copolymer is a non-ionic copolymer.

The Wang et al reference was cited in that it relates to a rubber modified styrene/acrylonitrile or methacrylate/maleic anhydride terpolymer and that it is drawn to the manufacture of an impact modifier essentially within the confines of that employed in the invention. First, this reference does not disclose the use of polybutene for enhancing the properties of its disclosed terpolymers. Second, Wang et al does not disclose methods similar to those of the claimed invention for adding the polybutene to the components of a rubber modified styrene maleic anhydride copolymer, particularly as recited in claims 6, 7, 19, 20, 21, 23, and 24 of the present application.

In summary, the claimed invention is totally different from Kim and/or Wang et al. It is addressed to the addition of polybutene to styrene, maleic anhydride, and rubber in order to enhance the properties of the resultant rubber modified styrene maleic anhydride copolymer. The methods recite the instant when this polybutene is added in the forming of the rubber modified styrene maleic anhydride copolymer during a polymerization process. Neither Kim nor Wang when considered singly or in combination disclose, teach, or suggest the claimed invention. Applicants request that the rejection of the claims on this basis be withdrawn.

Summary and Conclusion

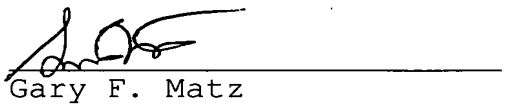
The claimed invention, particularly as now recited in amended claim 1, is not taught, disclosed, or even suggested in the references when taken singly or in combination.

Applicants for the first time disclose and claim a non-ionic styrenic resin composition comprising a non-ionic rubber

modified styrene maleic anhydride copolymer and polybutene, and optionally other additives. The polybutene is added to the components of forming a rubber modified styrene maleic anhydride copolymer immediately before, during, or after the polymerization process in a polymerization reactor vessel or prior to or after the devolatilization process as recited in claims 6, 7, 19-21 and 23-24.

Applicants respectfully request that a timely Notice of Allowance be issued in this case.

Respectfully submitted,



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